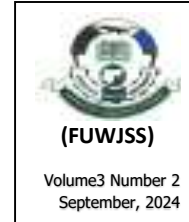# TRAMADOL ABUSE AND ROAD TRAFFIC CRASHES AMONG COMMERCIAL TRICYCLE RIDERS IN JOS METROPOLIS, NIGERIA

Mundi Patrick Supji[1]
Joseph Longshak Kosen[2]
Peace Satzen Azi[3]
Joshua Chiroma Gandi[4]
Shuaibu Umar Shitu[5]
[1&2]Department of General and Applied Psychology,
Faculty of Social Sciences, University of Jos
[3]Department of General and Applied Psychology,
Faculty of Social Sciences, University of Jos
[4]Department of Psychology, Nigerian Defence Academy, Kaduna
[5]Department of Psychology, Faculty of Social Sciences, Nasarawa State University, Keffi.
Corresponding Author*: mundisupji62@gmail.com; supjim@unijos.edu.ng*

Abstract

This study examines tramadol abuse and how this induces road traffic crashes among commercial tricycle riders in Jos Metropolis. One hundred and eighty three male participants from Bukuru Tricycle Park(N=45), Old Airport Road round about Tricycle Park(N=63), Terminus Tricycle Park (33) and Angwan Rukuba Tricycle Park(N=42) volunteered and were assessed with the Drug Abuse Screening Test, adult version (DAST-20) to generate data for the study. Results showed that the first and second hypotheses were significant [F=3.177, df=2, 178, P<.000] and [F=3.177, df=2, 177, P<.044 respectively. Conversely, the third hypothesis was not significant F=3.066, df=1,178, P=0.082]. The study concludes that tricyclists who abuse tramadol are more vulnerable to road traffic accidents, and that adolescents are more prone to road traffic accidents than adults and the aged. The study recommends that the Federal Road Safety Commission and concerned citizens should intensify strategic enlightenment efforts on the dangers associated with tramadol abuse whilst riding in order to curb its menace.

Keywords: Age, Road Traffic Crashes, Tramadol Abuse, Tricycle Riders

Introduction

Tramadol, also called Tramol, is an opioid analgesic that relieves pain by attaching itself to pain receptors in the brain to alter pain perception. When taken orally the onset of pain relieve usually occurs within about an hour. This Over-The-Counter (OTC) drug is sold as Ultram, Conzip, Rybix OCD, or Ryzolt and was first approved for use by the United States (U.S.) Food and Drug Administration (FDA) in 1995 as a non-controlled analgesic drug for the management of moderate to severe pain. However, because it became a substance of abuse, the U. S. Drug Enforcement Administration (DEA) changed its status to a controlled substance in August 18, 2014. Substance abuse is a pattern of behaviour whereby people rely on a drug excessively and regularly, bringing damage to their relationships, functioning poorly at work, or putting themselves or others in harm's way (Comer, 2007). Freudian psychoanalytic theory which says that the pleasure-seeking of the id and the over-indulgence of oral stimulation (during oral stage) are important in the development of drug abuse behaviours seem appropriate in this case. When the strength of the id dominates that of the ego and superego, it satisfies the individual's pleasure irrespective of consequences. When a mother over-protects a child at oral stage, the id is indulged, resulting into substance abuse in later life (Grumbiner, 2010). An over- or under-breastfed child can become orally fixated, leading to continued seeking for oral stimulations even at adulthood stage.

One contemporary psychoanalytic view of substance abuse is that, it is a defense against anxiety (Thombs, 2006). Conversely, behavioral theorists generally believe that behaviours, both desirable and undesirable ones (including substance abuse) are learned from the environment. Specifically, classical conditioning, proposed by Ivan Pavlov, holds that repeated pairing of a conditioned stimulus (CS) with an unconditioned stimulus (UCS) would elicit a conditioned response (CR) that is identical (or very similar) to the unconditioned response (UCR). Substance abuse, according to scholars of classical conditioning, occurs when an individual pairs a certain place, time or event to the use of a particular substance he/she is more likely to use or abuse same whenever in that condition. Similarly, B. F. Skinner's operant conditioning is a form of learning in which consequences of a behavior lead to changes in the probability of its occurrence. When the behavior is rewarded, there is high tendency for its repetition; when the behavior is punished, there is limited chance for its reoccurrence. The position of

operant condition concerning substance abuse is that, when an individual experiences desired effect from the substance or earned praises for using the substance, it means the individual is rewarded and so there is high tendency of repeating such behavior over and over again.

Social learning theory postulated by Bandura (1963) contends that both desirable and undesirable behaviors are learned through the environment by imitation, observation, and (or) modeling from significant others such as parents, teachers and influential adults whom the person looks up to as authority figure. This explains why those living in environments where a particular substance is accessible and acceptable are more likely to use and abuse such substance than those living in substance free environments (Carlson, 2014; Comer, 2007).

Cognitive theory by Aaron T. Beck on the other hand, says that people's beliefs, thoughts, assumptions, and expectations grossly influence their feelings and behavior. Substance abuse behavior in this case is associated with dysfunctional beliefs and assumptions that may include: "I need this substance to be okay", "Substance enhances my performance", "My life would be miserable without this substance", and lots more. However, biological theorists contend that substance abuse results from biological processes that include brain pathology, inheritance and neural activity, particularly the mesolimbic dopaminergic system (Carlson, 2014; Gross, 2010; Comer, 2007; Katzung, 2007; Gazzaniga & Heatherton, 2003). The dopamine hypothesis, for instance, says that drugs of abuse, tramadol inclusive, have positive reinforcing properties that are brought to bear on receptors of the ventral tegmental area (VTA) and nucleus accumbens (NAC) which eventually involve the dorsal striatum, and leading to the release of dopamine that largely sustains drug abuse behaviours.

An exploratory qualitative study by Peprah, Agyemang-Duah and Morgan (2020) using 23 purposively selected commercial vehicle drivers in Kumasi, Ghana, revealed that motivations for non-medical purpose for tramadol use include sexual enhancement, energy booster, fatigue reliever, euphoria, and alertness. This implies that significant numbers of people who subscribe to similar belief will continuously use and abuse tramadol for non-medical purposes. Similarly, it was found that 77.6% of respondents in Jirapa Municipality abuse tramadol while 88.9% take at least one other related drug (Saapiire, Namillah, Tanye, & Abubakari, 2021). Moreover, in a clinical setting in Sweden, it was found that patients who misuse tramadol were significantly more likely to drop out of treatment than non-users (Herrnsdorf, Holmstedt & Hakansson, 2022).

Most currently in Nigeria, it was found that the driving factors facilitating non-medical use of tramadol were 1. To enhance sexual performance-prolong ejaculation 2. To feel les hungry-reduce the desire for food 3. To sustain hard labour-withstand prolong menial labour (Molobe, Yesufu, Idigbe & Ibe, 2023).

The National survey on Drug Use and Health (NSDUH) in 2012 found that 3.2 million people in the US, aged 12 or older abuse the drug. The Drug Abuse Warning Network (DAWN) reported that roughly 20,000 emergency department visits in the US were related to tramadol non-medical use in 2011. In Egypt, Negm and Fouad (2014) found 83.3% prevalence rate of tramadol abuse among adolescents. Similarly, 64% of people visiting pharmacies in Babol, Northern Iran to obtain tramadol and other prescription drugs were found to be non-medical users (Zabihi, Hoseinzaadeh, Mardina, Mahmoud & Akbar, 2011). Zhang and Liu (2013) found that 90% of people were to be addicted to tramadol in China. In Nigeria, several case scenarios have provided some clue on rampant abuse of the drug. For example, a man admitted that he takes two tablets of tramadol daily after a hard work to quell the pains (The Nation News Paper of 25, January, 2015). In an attempt to get strong to win the school race, a Federal Government College student died in Ilorin while abusing tramadol on March 06, 2016.

Currently, the Premium Times News of October 3, 2022 reported that the National Drug Law Enforcement Agency (NDLEA) arrested a wanted drug baron in Lagos with 22.5mg of Tramadol worth N8.86 billion, according to the agency's spokesperson. This arrest, according to the news, comes barely five months after the arrest of another baron, who was reported to have imported containers of tramadol worth N22 billion in one month. In a related ugly development, it was revealed on the Vanguard News of January 22, 2023, that the NDLEA seized 1.7 million tramadol pills in Lagos. This escalating tromadol phenomenon is no doubt signaling danger in our country, considering the adverse effect of this drug on human behaviour.

Tramadol abuse is associated with both physical and psychological dependence on the drug, thereby placing abusers at risk of adverse tramadol reactions, such as seizures, fast heartbeat, respiratory depression, difficulty breathing, unusual drowsiness, convulsion, serotonin syndrome (excessive accumulation of serotonin at the synapse), and cerebral edema. The result of these adverse reactions of tramadol on commercial drivers and tricycle riders may be road traffic crashes (RTCs), which Dagona (1994) found to be the major cause of

death in Nigeria. Drunk driving puts not only the driver at risk of accident, but also passengers and those who share same route with the drugged driver (National Institute on Drug Abuse, 2015). A total of 60 cab-drivers who were admitted to the emergency unit with non-fatal motor accidents at the Al-Azhar University Hospital, Cairo Egypt, were studied by Aglan and Adawi (2016), wherefore they found that about 59.4% had traces of tramadol in their urine while others were positive for other substances.

Assari, Lankarani, Dejman, Farnia, Alasvandand Ahmadi (2014) examined drug use among Iranian drivers involved in fatal car accidents in which 51 participants were randomly drawn across 7 different prisons in Iran from 2,200 Iranian drivers who were imprisoned for fatal car accidents. The result showed that 60% of Iranian drivers who involve in fatal car accidents use illicit drugs, with Opioids, including tramadol (37.3%) being the most commonly used illicit drug, followed by cannabis (13.7%). The relationship between drink-driving behaviour and rates of traffic accidents was analyzed in a birth cohort of 907 New Zealand young people studied to the age of 21, by Horwood and Fergusson (2000). Drunk-driving was found significantly related ($P<0.0001$) to active traffic accidents which means the driver's behaviour contributed to the accidents. Inversely, the study opined that drunk-driving was not related ($P>0.15$) to passive accidents in which driver's behaviour did not contribute to accident. Those engaging in high rates of drunk-driving had significant rates of active traffic accidents that were 2.6 times higher than those who did not drink and drive.

Further analysis suggested that much of this association was due to confounding factors (notably driving behaviour) that were associated with both the drunk-driving on one hand and accident rates on the other hand. After adjustment for confounding factors, those engaging in high rates of drink-driving had significant rates of active accidents that were 1.5 ($P<0.01$) times higher than those who did not drink and drive. The researchers (Horwood & Fergusson (2000) concluded that although the findings support the view that regulation of drink-driving behaviour among young people is likely to contribute to the reduction in road traffic accidents, attempts at regulation of drink-driving also need to be accompanied by similar regulations in other aspects of risky or illegal driving behaviour amongst young people.

A study by Bingham and Shope (2004) examined the longitudinal patterns of adolescent psychosocial behaviour and substance use of five risky driving groups. Longitudinal data were collected from 2,085

participants (male=1,110 and female=885) ages 16 to 35 years. These participants were classified into five groups, differing in types and levels of risky driving. Analysis compared the psychosocial and substance use development of the participants in the risky driving groups. Study results showed that low level of parenting monitoring, greater parental permissiveness, a weaker social bond and high levels of rapid increases in substance use characterized the developmental trajectories of young adult risky drivers. In light of this, it was concluded that these developmental traits identify individuals who are likely to endanger themselves and others through risky driving and who should receive early interventions to reduce the likelihood of subsequent risky driving.

It must be noted that the trends in most substance abuse cases nowadays suggest concurrent abuse of multiple substances. However, the abuse of one substance alone still subsists. For example, in a 20-year retrospective study of patients at the inpatient and outpatient units of the Jos University Teaching Hospital, Audu et al (2008) found that 58.6% of the participants abused a single substance (such as tramadol). The US National Survey on Drug use and Health (NSDUH) and the Drug Abuse Warning Network (DAWN) found that more than 7 million Americans over the ages of 12 used tramadol for recreational purposes in 2013, an increase of more than 500, 000 from 2012. It was also found that emergency room visits due to adverse reactions to tramadol increased from 10, 000 in 2005 to nearly 27,500 in 2011. Although substance abuse is not a new comer to the Nigerian society, escalating tramadol phenomenon has not been long into practice. The high demand for tramadol by abusers has pushed most chemists, pharmacy stores, drug hawkers, and even some provision shops to become peddlers of the said drug.

The menace of tramadol abuse is a global phenomenon, even though alcohol and cannabis remain the two most abused substances worldwide (Audu, Ayuba, Mela, Choji & Sale, 2008; Smart & Ogborne, 2000; Binitie, 1988; Ebie & Obiora, 1988; Odejide, 1980). Tramadol abuse is associated with short term reactions, such as seizures, fast heartbeat, respiratory depression, difficulty breathing, unusual drowsiness, convulsion, serotonin syndrome, cerebral edema, and coma. The result of these adverse reactions on commercial drivers may be road traffic crashes (RTCs), which Dagona (1994) found to be the major cause of death in Nigeria. Long term problems, which might crop up due to addiction, associated with tramadol abuse are maladaptive patterns of behaviours, which themselves could be sources of road traffic crashes.

There have been divergent reasons (based on speculation) for the surge in tramadol demand in which the belief that it provides extra energy to work harder (than usual) for income has been the common. Thus, one of the motivation spurring commercial tricycle riders to use tramadol for non-medical purpose is to earn more income in the face of current stringent economic realities. Although researchers, such as Bassiony, El-Deen, Yousef, Raya, Abdel-Ghani and Atwa (2015); Zhang andLiu (2013); and Alti-Muazu and Aliyu (2008), documented the link between tramadol abuse alongside multiple substances and road traffic crashes, the abuse of only one substance (tramadol alone) appears to be grossly under-investigated in Nigeria. Also, moderating factors such as age and gender as well as other factors (like co-morbid maladaptive bahaviours) have not been significantly interrogated, while investigating tramadol among Nigerian population. Therefore, there is cogent need to investigate the links between tramadol abuse, age and road traffic crashes amongst tricycle riders in Jos metropolis.

Drug Abuse among Commercial Transport Workers in Nigeria
The use and abuse of psychoactive substances among commercial drivers have been investigated in Nigeria. One of these findings was carried on in Umuahia, Abia State, South Eastern Nigeria, where Akande et al (2023) in a cross sectional design using four hundred commercial bus drivers, discovered that 74.6% of drivers abuse psychoactive substances. The participants reported poor knowledge (54%) and poor perception (63.2%) of psychoactive substance abuse. The study also found that religion, poor knowledge and perception were associated with higher likelihood of substance abuse. In a related study, it was found that commercial tricycle riders in Uyo, South-South Nigeria reported frequent consumption of significant quantities of licit and illicit drugs such as alcohol, cannabis, cocaine and heroin (Nelson, Umoh, Essien & Brown 2018). These drug abuse were attributed to occupational hazards such as stress, fatigue and exhaustion.
Relationship between substance abuse and criminal behaviours have also been critically examined among commercial motor drivers in Lagos, Nigeria by Toyosi (2020). The finding established a significant relationship between alcohol abuse and road traffic accidents among drivers. Again, abuse of marijuana by commercial drivers was found to be strongly related with involvement in traffic offences. In the North Western Nigeria, Zaria, Kaduna State, it was revealed that 68% of commercial motorcycle and bus drivers abuse drugs including tobacco or

marijuana randomly (Shut, Bello, Adedokun, Manasseh, & Kor, 2021). This finding also revealed that frequent rates of road traffic accidents were majorly linked with drug abuse

Theoretical Framework

Social learning theory and biological model are adopted as the theoretical framework for this study, because they explain the concept of drug abuse better. Social learning theory postulated by Bandura (1963) contends that both desirable and undesirable behaviors are learned through the environment by imitation, observation, and (or) modeling from significant others such as parents, teachers and influential adults whom the person looks up to as authority figures. This explains why those living in environments where a particular substance is accessible and acceptable are more likely to use and abuse such substance than those living in substance free environments (Carlson, 2014; Comer, 2007). Our environment is just as influential as genetics or psychological traits in the development of addictive behaviours (Smiddy, 2017). This is why negative peer influence, especially among adolescents, is one of the major forces that contribute significantly to substance use and abuse. Biological theories of drug abuse focus on three principles which include genetic vulnerability, the dopamine reward theory, and the stress and adaptation theory. Genetic vulnerability theory holds that certain inherited genes predispose people to drug addiction. This implies that children born by parents who are drug addict are more likely to become drug addicts than children whose parents are not drug addicts. Dopamine reward theory on the other hand posits that the stimulation of the brain's reward centre, leading to the release of the reward neurotransmitter (dopamine) is associated with drug addiction. Moreover, drugs cause a surge in dopamine, which makes the brain associate drug use with pleasure and reward, thereby resulting to consistent use of drug to gain pleasure. Stress adaptation theory states that repeated use of drug to cope with stress, trauma, or negative emotion, can make the brain adapt, thereby changing the brain structure and function, resulting to tolerance and dependence.

Other biological theorists contend that substance abuse results from biological processes that include brain pathology, inheritance and neural activity, particularly the mesolimbic dopaminergic system (Carlson, 2014; Gross, 2010; Comer, 2007; Katzung, 2007; Gazzaniga & Heatherton, 2003). The dopamine hypothesis, for instance, says that drugs of abuse, tramadol inclusive, have positive reinforcing properties

that are brought to bear on receptors of the ventral tegmental area (VTA) and nucleus accumbens (NAC) which eventually involve the dorsal striatum, and leading to the release of dopamine that largely sustains drug abuse behaviours.

Research Methodology

The study adopted a 2×3 factorial design to investigate the effect of "tramadol abuse and influence of age on road traffic crashes among tricycle riders in Jos metropolis". Factorial design is adopted first of all because there are two independent variables (tramadol ingestion and age). The levels of tramadol ingestion in this study are "use level" and "abuse level" while the levels of age include "adolescents, adults, and the "aged".

The population of interest in this study is Tricycle Riders in Jos Metropolis.183 male participants who admitted to ingesting tramadol volunteered and were drawn from various parts of the metropolis-Bukuru Tricycle Park(N=45), Old Airport Road round about Tricycle Park(N=63), Terminus Tricycle Park(33) and Angwan Rukuba Tricycle Park(N=42). Their ages ranged from 15 to 60, adolescents were 49(26.8%), adults 99(54.1%) and those who were above 50 years, 35 (19.1%). 115(62.8%) were Christians while 68(37.2%) were Muslims. 47(25.7%) attended primary school, 82(44.8%) had secondary school certificates, 37(20.2%) went through tertiary institutions and 17 (9.3%) had no formal education. Majority of this population are of low or average socioeconomic status, and they rely solely on commercial tricycle riding for their daily living.

The Drug Abuse Screening Test-20 (DAST-20) (Skinner, 1982) Adult Version was used to measure Tramadol Abuse. DAST-20 measures the abuse of multiple drugs- marijuana, valium, speed, hallucinogens, and tramadol. It is a 21-item instrument which requires respondents to endorse 'yes' or 'no'. A score of 0 on the scale represents non use and high indicates abuse. DAST-20 has a high internal consistency (reliability) of .92, and validity of .74. A Section to measure frequencies of road traffic accidents - 'once', twice', 'trice', 'others specified', and 'none' was added to the questionnaire and there were demographic variables like age, gender, education level, marital status and religion.

The study procedure was preceded by obtaining permission from the University of Jos as well as from the local branch EXCO of Tricycle Riders Association. Thereafter, these commercial tricycle riders were met at different parks. Cooperation for voluntary participation was

enlisted from leaders of each of the four parks, and purpose of visit explained before data collection began. The researchers, one at each park introduced self to the participants and assured of confidentiality regarding the data to be collected. As the tricycle riders await their passengers on a queue, those willing, can read and write, and whose positions on the queue was about 10 to 15 minutes before loading their tricycles were approached and asked to fill, and return the questionnaire there and then. The locations from which data were collected are Angwan-Rukuba tricycle park, Old Airport Roundabout tricycle park, Bukuru tricycle park and Terminus tricycle park. Since the Instrument used had provision for multiple drug use, those participants that endorsed tramadol use only were singled out for analysis.

The analysis of collected data used the Statistical Package for Social Sciences (SPSS) version 23 software. Both descriptive and inferential statistical analyses were conducted in this study. Descriptive statistics, particularly the mean, standard deviation, range and frequencies were used, while the inferential statistics used to test the hypotheses was Analysis of Variance (ANOVA. This method of data analysis was chosen because it enables simultaneous determination of the effects of two or more independent variables on the dependent variable being measured.

Socio-Demographic of Participants
Table 1: Frequency table depicting participants' demographic data

	Frequency	Percentage
Gender		
Males	183	100.0
Total	183	100.0
Age		
Adolescents (15-19 years)	49	26.8
Adult (20-45 years)	99	54.1
Aged (46 to 60)	35	19.1
Total	183	100.0
Religion		
Christianity	115	62.8
Islam	68	37.2
Total	183	100.0
Education		
Primary	47	25.7
Secondary	82	44.8
Tertiary	37	20.2

Not been to school	17	9.3
Total	183	100.0
Marital Status		
Single	96	52.5
Married	87	47.5
Total	183	100.0
Reasons for drug		
Pleasure	81	44.3
Strength	20	10.9
Rest	26	14.2
None	56	30.6
Total	183	100.0

From table 1 above, all 183 (100%) participants were males. Adolescents were 49(26.8%), adults 99(54.1%) and the aged were 35 (19.1%). 115(62.8%) were Christians while 68(37.2%) were Muslims. 47(25.7%) attended primary school, 82(44.8%) had secondary school certificates, 37(20.2%) went through tertiary institutions and 17 (9.3%) had no certificates at all. 96 (52.5%) were single, and 87 (47.5%) were married. Concerning reasons for drug use, 81(44.3%) participants reported that they use drugs for pleasure/high, 20(10.9%) use drugs to give them strength/support for work, while 26(14.2%) use drugs to calm them to rest/sleep, while 56(30.6%) gave no reason for drug use.

Table 2: ANOVA summary for tramadol abuse and road traffic crashes

Source	Type III Sum of Squares	Df	Mean Square	F	P
Corrected Model	41.057a	4	10.264	5.523	.000
Intercept	337.117	1	337.117	181.387	.000
Tramadol abuse	25.068	1	25.068	13.488	.000
Error	330.823	178	1.859		
Total	841.000	183			
Corrected Total	371.880	182			

   a.   R Squared = .110 (Adjusted R Squared = .090)

Table 3: Mean and Std. Deviation for tramadol abuse and road traffic accidents

Tramadol abuse	Mean	Std. Deviation
Tramadol Use	1.45	1.25
Tramadol Abuse	2.68	2.08

Results from tables 2 & 3 shows that there was a significant main effect of tramadol abuse on frequency of road traffic accidents, F=3.177, df 2,178 P=.000. Participants who abuse tramadol (Mean=2.68, S.D.=2.08) reported more road traffic accidents than those who use tramadol (Mean=1.45, S.D.=1.25). The alternative hypothesis is therefore accepted.

Table 4: ANOVA summary table for age and road traffic crashes

Source	Type III Sum of Squares	Df	Mean Square	F	P
Corrected Model	41.057[a]	4	10.264	5.523	.000
Intercept	337.117	1	337.117	181.387	.000
Age	11.810	2	5.905	3.177	.044
Error	330.823	178	1.859		
Total	841.000	183			
Corrected Total	371.880	182			

Table 5: Mean and Std Deviation for age and road traffic accidents

Age	Mean	Std. Deviation
Adolescents	2.02	1.76
Adults	1.45	1.33
Aged	1.43	1.04

Results from tables 4 & 5 above shows that there was a significant main effect of age on frequency of road traffic accidents, F=3.177, df=2,178 P=.044. Adolescents (Mean=2.02, S.D.=1.76) had more road traffic accidents than adults (Mean=1.45, S.D.=1.33) and the aged(Mean=1.43, S.D.=1.04).

Table 6: ANOVA Summary table for the interaction effect of age and tramadol ingestion

Source	Type III Sum of Squares	Df	Mean Square	F	P
Corrected Model	41.057[a]	4	10.264	5.523	.000
Intercept	337.117	1	337.117	181.387	.000
Age * Tramadol ingestion	5.699	1	5.699	3.066	.082
Error	330.823	178	1.859		
Total	841.000	183			
Corrected Total	371.880	182			

a.   R Squared = .110 (Adjusted R Squared = .090)

Table 7: Mean and Std Deviation for interaction of age and tramadol

Tramadol Abuse	Age	Mean	Std. Deviation	N
	Adolescents	1.6316	1.38371	38
Tramadol Use	Adults	1.3864	1.28145	88
	Aged	1.4286	1.03713	35
	Total	1.4534	1.25474	161
Tramadol Abuse	Adolescents	3.3636	2.29228	11
	Adults	2.0000	1.67332	11
	Total	2.6818	2.07906	22
	Adolescents	2.0204	1.76174	49
	Adults	1.4545	1.33457	99
Total	Aged	1.4286	1.03713	35
	Total	1.6011	1.42944	183

Result from table 18 and 19 F=3.066, df 1,178, P=.082, shows that there was no significant interaction effect of tramadol abuse and age on frequency of road traffic accidents. The alternative hypothesis is therefore rejected.

The first hypothesis claimed that tramadol abuse will have significant effect on frequency of road traffic crashes. Results show that there was a significant main effect of tramadol abuse on frequency of road traffic accidents. This finding supports earlier research by Aglan and Adawi (2016) who found a relationship between substance abuse and road traffic accidents among cab-drivers admitted to the emergency unit of Al-Azhar University Hospital, Cairo, Egypt, and Alti-Mauzu and Aliyu (2008) who also found that 59.5% of road traffic accidents were associated with the use of psychoactive drugs, including tramadol.

Second hypothesis tested the effect of age on frequency of road traffic accidents. Results revealed that adolescents had more road traffic accidents than adults and the aged. This result agrees with the finding by Teen Drivers (2014), which found that motor vehicle crashes are the leading cause of death among drivers aged 16 to 19 years. Risky driving behaviour is common among adolescents, especially among young males prone to externalizing behaviours such as substance abuse, crime and affiliating with deviant peers (Fergusson, Swam-Capbell & Horwood, 2003). Erickson (1963) noted that adolescence is a period of identity crisis where role confusion may result from failure to integrate perception of the self into a coherent whole leading to negative personality characterized by abnormal or delinquent bahaviour that could manifests in drug taking or suicide.

Hypothesis three posited that tramadol abuse and age will interact to influence frequency of road traffic accidents. The results failed to support this idea. The preceding paragraphs have clearly revealed that age and tramadol individually moderate road traffic crashes. This implies that as they interact their respective power to influence diminishes. This is the tentative conclusion derivable from this study. More investigations will perhaps help us understand this phenomenon better.

Conclusion and Recommendations

The main aim of this study was to examine the roles of tramadol abuse and age on road traffic crashes among tricycle riders in Jos metropolis. The specific objectives were to examine the frequencies of RTCs resulting from tramadol abuse in the population of interest; establish the moderating effect of age on road traffic crashes among tricycle riders that abuse tramadol; and verify if age and tramadol abuse will have joint effect on RTCs among tricycle riders. Results of this study revealed that tricyclists who abuse tramadol are more vulnerable to road traffic accidents, and that adolescents are more prone to road traffic accidents than adults and the aged. However, when tramadol abuse and age interact, their power of effect diminishes. Based on the findings of this study, it is hereto recommended that Law enforcement agencies, especially the National Drug Law Enforcement Agency (NDLEA) and the Federal Road Safety Corps (FRSC) on the one hand, and non governmental agencies interested should intensify efforts in the quest to reduce abuse of drugs and road traffic crashes; and researchers should

further investigate whether tramadol abuse and age interact to moderate road traffic crashes among tricycle riders.
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